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Title: Use of typhoid Vi-conjugate vaccine for outbreak management in Zimbabwe

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**Title:** Use of typhoid Vi-conjugate vaccine for outbreak management in Zimbabwe

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Joe Bilcke and colleagues investigated the cost-effectiveness of alternative delivery strategies for typhoid Vi-conjugate vaccine (TCV) in each of the 54 countries eligible for financial support from Gavi, the Vaccine Alliance. In settings with high *Salmonella enterica* serovar Typhi incidence, an approach of routine vaccination of infants plus a catch-up campaign to the age of 15 years seems cost-effective and would reduce the number of cases in Zimbabwe by 68% over the next 10 years.<sup>1</sup>

Recently Zimbabwe conducted a one-off mass TCV vaccination campaign funded by Gavi targeting children 6 months to 15 years of age in communities affected by an on-going typhoid outbreak.<sup>2</sup> This has been the first use of TCV and the first typhoid outbreak response vaccination campaign in Africa. The present and past outbreaks of cholera and typhoid are a terrible consequence of Zimbabwe's failure to invest in and manage both its basic water and sanitation infrastructure and its health care system.<sup>3</sup> In addition, dilapidated infrastructure, lack of diagnostics and drugs, brain drain, prohibitive user fees in health facilities and strikes by medical personnel have contributed to most recent outbreak of typhoid..

FIEBRE (Febrile Illness Evaluation in a Broad Range of Endemicities, <https://www.lshtm.ac.uk/research/centres-projects-groups/fiebre>), a multi-country study investigating the causes of fever in sub-Saharan Africa and southeast Asia has been enrolling adults and children presenting with fever at health facilities in Harare since June 2018. As part of the study, multiple diagnostic investigations are performed including; automated blood cultures, bacterial identification and drug susceptibility testing. *S. Typhi* has been isolated from 23/133 and 38/183 blood culture in children and adults respectively. Of the 61 *S. Typhi* isolates 54(88.5%) were multi-drug and 4 in 5 (80.3%) displayed diminished fluoroquinolone susceptibility. In the first three months after the vaccination campaign we observed a sharp decrease in one of the worst affected communities in the proportion of confirmed and suspected typhoid cases among children, but not adults (figure 1).

While the TCV vaccination campaign seems highly effective in reducing the typhoid incidence among children, a more comprehensive approach such as vaccination of adults and WASH (Water, sanitation and hygiene) interventions will be needed to halt this and future typhoid outbreaks once established.

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**Author contributions:**

IDO, NF and KK contributed to the idea, concept and design of the manuscript. IDO and KK analyzed and interpreted the data. All authors contributed to drafting the manuscript, revised and approved the final draft for publication.

**Declaration of interests:** There are no conflicts of interest to declare.

## References:

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**Figure 1** Confirmed and suspected *S. Typhi* cases according to age group and in relation to the TCV mass vaccination campaign

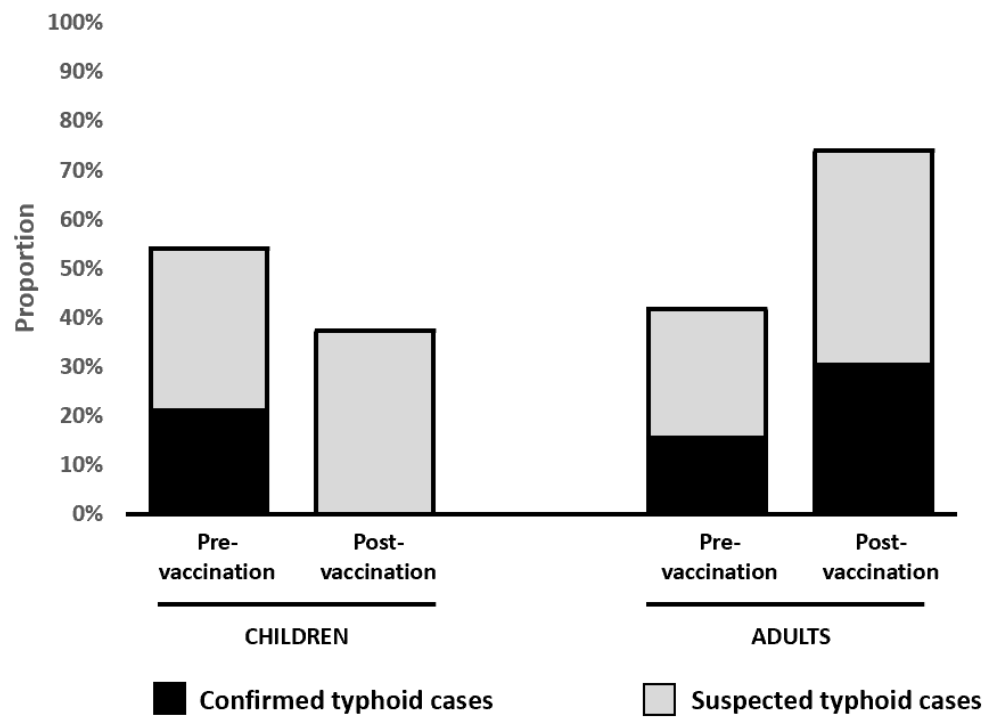
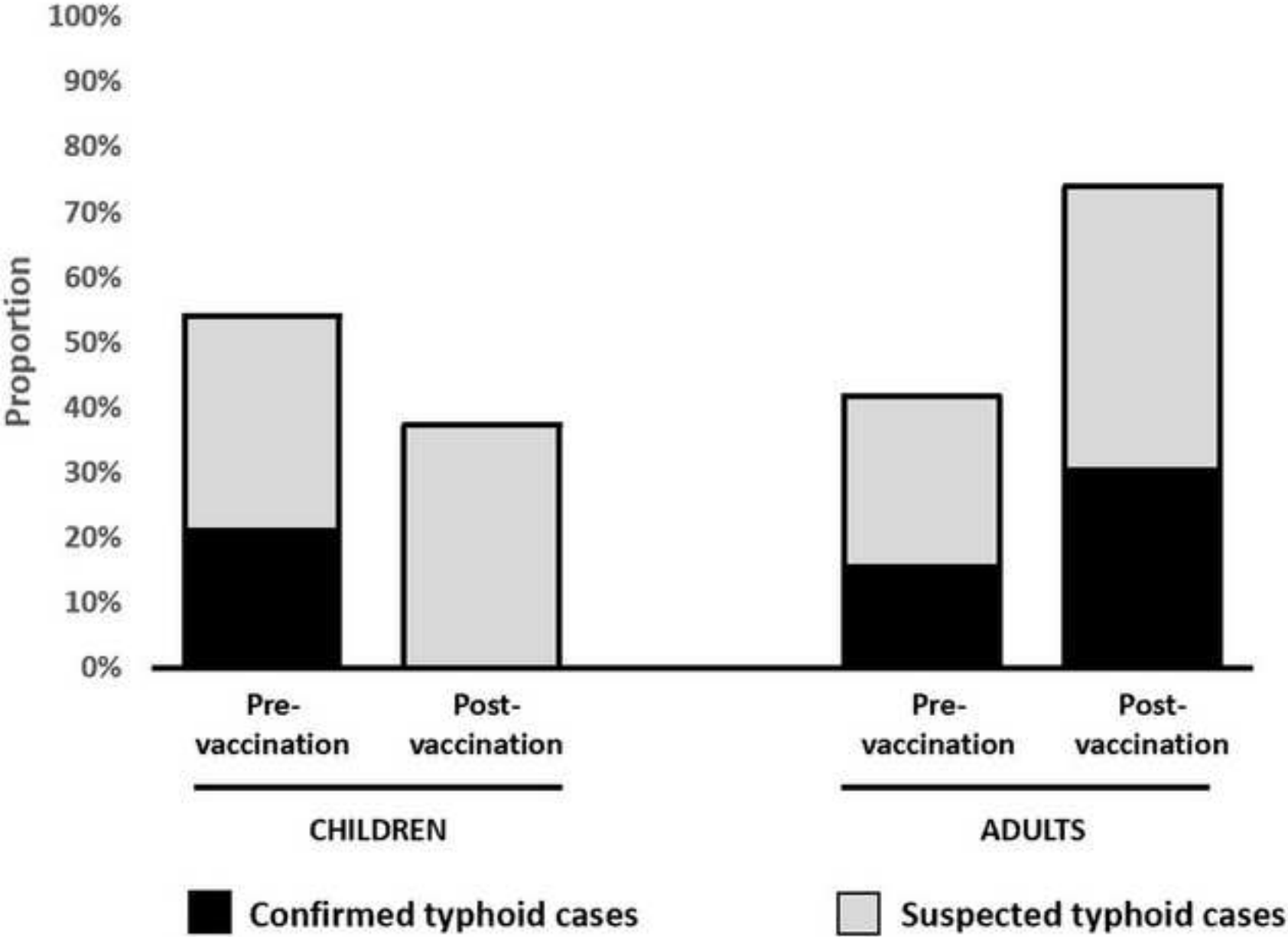


Figure  
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To the Editor in Chief

Dr John McConnell

The Lancet Infectious Diseases

RE: Correspondence in response to the article entitled “Cost-effectiveness of routine and campaign use of typhoid Vi-conjugate vaccine in Gavi-eligible countries: a modelling study” by Blicke et al. (May 23 2019)

June 25th, 2019

Dear Dr John McConnell

Please find attached the correspondence entitled:

“Use of typhoid Vi-conjugate vaccine for outbreak management in Zimbabwe” to be considered for publication in the *Lancet Infectious Diseases* in response to the article published by Blicke et al entitled Correspondence in response to the article entitled “*Cost-effectiveness of routine and campaign use of typhoid Vi-conjugate vaccine in Gavi-eligible countries: a modelling study*”.

We read with great interest the publication by Blicke et al estimating the effect of different typhoid conjugate vaccine (TCV) strategies using mathematical modeling. Earlier this year a TCV mass vaccination campaign was conducted in Zimbabwe in response to an ongoing typhoid outbreak. We report on the effect of TCV on *Salmonella* Typhi cases by comparing *S. Typhi* positive blood cultures in the period pre- and post vaccination.

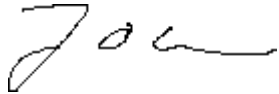
Our data emphasize the need for comprehensive strategies including vaccination of adults and children together with WASH interventions for outbreak control.

We believe that these results are of interest to the readership of the *Lancet infectious Diseases*. The manuscript is not under evaluation elsewhere. All co-authors fulfil ICMJE criteria for authorship, have seen the final draft and approved the manuscript for submission for publication.

We hope that you find our manuscript of interest for publication in *Lancet infectious Diseases* and we are looking forward to your reply.

Sincerely and on behalf of all authors

Ioana D. Olaru

A handwritten signature in black ink, appearing to read 'Ioana', with a stylized, flowing script.